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| 09/852,111      | 05/09/2001  | Seiichi Hayashi      | F-6971              | 5010             |

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EXAMINER

SONG, HOON K

ART UNIT PAPER NUMBER

2882

DATE MAILED: 10/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/852,111

Applicant(s)

HAYASHI ET AL.

Examiner

Hoon Song

Art Unit

2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-19 is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 May 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamakura et al. (US 5755877) in view of Koppel (US 5619548).

Regarding claims 1, 6 and 10, Kamakura teaches a thin film measuring apparatus integrated into a thin film deposition system (figure 1), comprising:

a sealed thin film deposition furnace (1) comprising an X-ray permeable X-ray incidence window (10) and an X-ray extraction window (10);

thin film substance generating means (3a-3d) for generating thin film deposition particles of a thin film substance in the thin film deposition furnace; and

substrate supporting means (4) for supporting a thin film deposition substrate in the thin film deposition furnace at a position for allowing the thin film deposition particles of the thin film deposition substance generated from the thin film substance generating means to adhere on the surface of the substrate,

the thin film measuring apparatus comprising:

an X-ray irradiation unit (7) for irradiating an X-ray through the X-ray incidence window toward the surface of the thin film deposition substrate supported in the thin film deposition furnace; and

an X-ray sensing unit (11) for sensing the X-ray reflected from the thin film deposition substrate through the X-ray extraction window.

However Stall does not teach the curved monochromator with diverging x-ray

Koppel teaches the thin film measuring apparatus comprising curved monochromator and divergent x-ray source (figure 2).

In view of Koppel, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to adopt the curved monochromator with diverging x-ray beam in order to measure the properties of thin films disposed on substrates (abstract). Accordingly, one would be motivated to adopt the known measuring apparatus because it would decrease the time required to measure the structure of a thin film layer by concurrently impinging x-rays on the thin film surface at various angles and concurrently detecting x-rays reflected from the thin film (column 2 line 30).

Regarding claims 2, 7 and 12, Koppel teaches a X-ray measurement apparatus for measuring a rocking curve using as a measuring object a thin film having a mixed crystal structure or a superlattice structure formed on the surface of the thin film deposition substrate having a known Bragg's angle, the X-ray irradiation unit having a mean X-ray incident angle for allowing the X-ray to impinge on the thin film on the surface of the thin film deposition substrate with an angle set at around the known Bragg's angle (figure 4 and 6, column 3 line 34+).

Regarding claims 3, 8 and 13, Koppel teaches an X-ray measurement apparatus for measuring X-ray reflectivity, wherein the X-ray irradiation unit has an X-ray incident angle for allowing the X-ray to impinge on the thin film on the surface of the thin film deposition substrate with an angle set at a low angle range required for measuring X-ray reflectivity (figure 1).

Regarding claims 4, 9 and 14, Kamakura teaches a control unit for controlling, by previously storing desired basic information for forming a thin film in the thin film deposition furnace, at least deposition and measurement of the thin film formed on the surface of the thin film deposition substrate based on the basic information (column 5 line 51+).

Regarding claim 5, measuring intervals with the thin film measuring apparatus are shortened based on the basic information as deposition of the thin film comes to an end (figure 4)

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamakura as modified by Koppel as applied to claim 10 above, and further in view of Ramani et al. (US 5895622).

Regarding claim 11, Kamakura as modified by Koppel fails to teach exchange means.

Ramani teaches a exchanging means to transport sample into a chamber (figure 1).

It would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to adopt Ramani's exchanging means because it would increase the manufacturing process.

#### ***Allowable Subject Matter***

Claims 15-19 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: None of the prior art teaches or suggests a thin film deposition system having an X-ray sensing unit disposed at the outside of the thin film deposition furnace and sensing the X-ray reflected from a part of the surface of the thin film deposition substrate through the sample thin film deposition opening and the X-ray extraction window, comprising: a shield member facing the surface of the thin film deposition substrate supported in the thin film deposition furnace; a thin film deposition opening formed at a part of the shield member and for allowing a part of the thin film deposition substrate to expose so that the thin film deposition particles of the thin film deposition substance generated from the thin film substance generating means are adhered on the

exposed part; and a sample thin film deposition opening formed at another part of the shield member and for allowing another part of the thin film deposition substrate to expose so that the thin film deposition particles of the thin film deposition substance generated from the thin film substance generating means are adhered on the another exposed part; and the X-ray irradiation unit comprising an X-ray source for emitting a divergent X-ray, and a curved monochromator for at least converting the divergent X-ray emitted from the X-ray source into a monochromatic X-ray and for allowing the monochromatic X-ray to converge on the thin film deposition surface of the thin film deposition sample substrate.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoon Song whose telephone number is 703-308-2736. The examiner can normally be reached on 8:30 AM - 5 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on 703-308-4858. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Hoon Song HKS



DAVID V. BRUCE  
PRIMARY EXAMINER

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